REMARKS

Claims 1-28 are pending and presented for examination in this application. Claims 14, 17-27 are allowed in the office action (paragraph 8, page 5). Claims 12, 13, 15 and 16 are indicated in the office action (paragraph 8, page 5) to be allowable if rewritten in independent form.

Specification, Drawings

At page 2, paragraph 2 of the Office Action, an objection to Figure 20 and the specification has been made with regard to items 4, 8, 9, 10, 11 and 12 of Fig. 20 being said to go unmentioned in the description. In response, Applicants have amended their specification at the paragraph bridging pages 34-35. Applicants further propose to remove numerals 11 and 12 from Figure 20. Reconsideration and withdrawal of the objection is respectfully requested.

Anticipation Rejection

At page 2, paragraph 4 of the Office Action, claims 1, 4 and 6-11 have been rejected under 35 U.S.C. 102(b) as being anticipated by Burt et al. (USP 6,052,213).

Applicants traverse the rejection as follows.

The present application claims an optical device having periodic multilayer structure, namely one-dimensional periodic structure. Assuming that such structure is periodic in the Y-axis, the surface pattern in the XY plane (layer surface) is not periodic. Also, the application claims a feature that incident or exit surface (end surface) is not in parallel with the XY plane. The claimed invention therefore differs from Burt.

Burt's device uses its end face to be an incident surface, however, Burt differs from Applicant's presently claimed invention. As clearly shown in Figs. 1, 7a and 9b of Burt, the disclosed laminate structure in Burt is a three-layer structure consisting of "clad/core/clad" or the modified example of such structure. Burt's structure is not periodic as Applicant's claims recite, because the "core" in Burt is not repeated. Moreover, the light is transmitted in the core that is a

uniform member.

As shown in Figs. 1, 2, 4b, 7b, 9a and 10, Burt shows periodic structure in the XY plane but does not disclose a periodic feature in the Y-axis direction.

Thus, Burt's device is completely differ in optical structure from Applicant's claimed device.

Wherefore, reconsideration and withdrawal of the anticipation rejection are respectfully requested.

Obviousness Rejections

At page 3, paragraph 6 of the Office Action, claims 2-3 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Burt in view of Todori et al. (USP 6,002,522). The Examiner admits that Burt "is silent concerning the particular period to wavelength relation of claim 2, and he does not state that one period is constituted by layers formed out of different materials." (Office Action, page 3.) As to what is missing in Burt, the Examiner cites Todori, column 6, lines 35-50, and takes the position that it would have been obvious to one of ordinary skill in the art to have the photonic crystal device have a period greater than or equal to one half the wavelength divided by the refractive index in order to have proper signal transmission in optical communications.

Applicants respectfully traverse this obviousness rejection.

The presently claimed invention is more removed from Burt than the Examiner has acknowledged. Applicant's above remarks distinguishing Burt apply here, also.

Referring to the secondary reference, Todori, similarly to Burt, Todori discloses a "clad/ core/clad" structure. See Figs. 9, 11, 13 and 15. Thus Todori fails to teach periodic structure in the Y-axis direction.

Incidentally, the Examiner is improperly comparing different kinds of periods. Todori and Applicant's claim 2 concern different kinds of periods. Todori teaches a period of nearly half of the wavelength (column 6, lines 41-44). However, this period is not in the Y-axis direction but in the XY plane. The claimed invention (claim 2) recites a period in a direction

perpendicular to the light transmitting direction. The Examiner merely compares the numerical ranges between the periods of the reference and the claimed invention, which comparison is improper because it is not proper to compare the different kinds of periods.

Moreover, a person of ordinary skill in Applicants' art would not have combined Burt and Todori in the manner that the Examiner proposes. Todori discloses two diffraction gratings set up to form a photonic band. Burt explicitly pointed out that he was working with a novel finding about another property of photonic crystals, not photonic band gaps. (Burt, col. 1, line 64-col. 2, line 1.) Burt taught away from photonic band gaps, towards a different property of photonic crystals, namely, pitch. The Examiner's combination of Burt and Todori is completely artificial and not how one of ordinary skill in the art would read Burt or Todori. Rather, such a person would take Burt at his word, that he was teaching a novel property that was different from working with photonic bands, and such a person would not try to combine photonic band equations (such as from Todori) with Burt because Burt was teaching the separateness of his pitch-related work.

Wherefore, reconsideration and withdrawal of the obviousness rejection of claims 2-3 are respectfully requested.

At page 4, paragraph 7, Claims 5 and 28 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Burt in view of Joannopoulos et al. (USP 6,130,780). The Examiner admits that "Burt is silent concerning the refractive index difference being not less than .1 in a wavelength used or having two differing refractive indices between respective layers." However, the Examiner reverts to Joannopoulos with respect to this feature.

Applicants respectfully traverse this obviousness rejection.

Joannopoulos discloses that the light exit surface is to be in the XY-plane. Such a kind of light exit surface is well-known. On the other hand, the claimed invention defines that the incident or exit surface is not parallel to the layer surface, therefore, the basic structure of Applicant's claimed invention is different from Joannopoulos. It is not obvious to pick up refractive index ratio as taught in Fig. 6 and apply to the layer structure of the present invention.

Also, Joannopoulos is based on photonic band gaps, and a person of ordinary skill in the

art would not have combined Joannopoulos and Burt in the manner that the Examiner has suggested. As has already been discussed above, Burt expressly set forth that his work was based on a different property of photonic crystals, involving pitch. Burt expressly contrasted his own work with that of the previous body of work involving photonic band gaps. A person of ordinary skill in the art reading Burt would see what Burt himself had to say, contrasting his technical principles from work on photonic band gap, and such a person clearly would not try to force Joannopolous' photonic band gap technology into Burt.

Wherefore, reconsideration and withdrawal of the obviousness rejection of claims 5 and 28 are respectfully requested.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 1-28 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephone or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,

Mary E. Goulet
Reg. No. 35,884

WHITHAM CURTIS &
CHRISTOFFERSON, P.C.
11491 Sunset Hills Rd., Suite 340
Reston, VA 20190
Tel. 703-787-9400